

# THE ANNALS

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XXXI.—*General Features of Chusan, with remarks on the Flora and Fauna of that Island.* By THEODORE CANTOR, M.D., Bengal Medical Service, &c.

THE island of Chusan, or Great Chusan, is situated on the east coast of China, between lat.  $30^{\circ}$  and  $31^{\circ}$  N. and long.  $122^{\circ}$  and  $123^{\circ}$  E.\* It is the greatest and most important of the group of islands which bear that name, and is separated from the nearest main-land, Keeto Point, by an arm of the sea, about ten miles across, thickly studded with smaller islands, varying in extent from little slightly elevated rocks to islands several miles in circumference. This uninterrupted chain of islands renders it necessary to look upon Chusan, and the whole group indeed, more as a part of the continent than as islands. The extremes of temperature are more like those of a continent than of an island. The aspect of Chusan is hilly, being traversed by steep rocks in all directions, occasionally surmounted by peaks with intervening valleys. The rocks belong to the older volcanic series, chiefly consisting of claystone, porphyry, and a number of varieties, of which Lieut. Ouchterlony in his statistical notes has given the following description:—

“ In portions of the cliffs on the south and north coasts the rocks are observed to assume a columnar structure†, and dykes and masses of greenstone burst through the beds of claystone on various points, indurating and altering them to a considerable extent. On the west coast the claystone por-

\* An observatory erected in 1840 near the engineer camp was situated in  $30^{\circ} 0' 10''$  N. and  $122^{\circ} 14'$  E. The variation of compass was found to be  $2^{\circ} 33'$  E., magnetic dip  $42^{\circ} 16'$ . The circumference of the island is  $51\frac{1}{2}$  miles; its greatest length about 20, its greatest breadth  $10\frac{1}{2}$  miles. The direction of the island is from N.W. to S.E.

† Columnar structure is also visible on Buffalo Island, a short distance to the southward of Chusan.

phyry assumes a slaty or laminated structure, and appears to be quarried extensively, both for use on the island and for exportation to the main-land, affording excellent slabs for paving and for floors, and good blocks for common building purposes. A coarse conglomerate is also to be seen intervening between beds of the claystone, imbedding angular fragments of many descriptions of igneous rocks and workable porphyry, which is also quarried and made use of for pillars, blocks for corn-mills, basement slabs, &c."—*Calcutta Journal of Nat. Hist.*, vol. ii. p. 136.

As characteristic features in the island, may be mentioned the absence of rivers, lakes and forests. The valleys are fertilized by numerous streamlets communicating with narrow canals, which traverse the island, and serve both for agricultural purposes as well as means of communication for want of carriage-roads. All the canals, at least in several miles distance round Ting-haé, the principal city of the island, discharge their surplus into a common canal, which passing through the city communicates with the sea.

The entire absence of forests appears to be of a comparative recent date, to judge from certain passages in a letter written by Mr. Cunningham in the year 1701, in which *deer* are mentioned as being in abundance, which circumstance would presuppose a woody appearance of some part of Chusan at least. The writer says, "The island in general abounds with all sorts of provisions, such as cows, buffaloes, goats, deer, hogs, wild and tame geese, ducks and hens, rice, wheat, calavances, coleworts, turnips, potatoes, carrots, beetach and spinach. Here also the tea grows in great plenty on the tops of the hills, but it is not in such esteem as that which grows on more mountainous islands. Although this island is pretty well stored with people, it is far from what it was in P. Martini's time, as he describes Chusan. The rest of the circumjacent islands are either desert or meanly inhabited by a few people, but all of them stored with abundance of deer, for it is not long since Chusan began to be peopled. It is true in Martini's days, about fifty years ago, it was very populous for the space of three or four years, at which time the fury of the Tartar conquest was so great that they left it desolate, not sparing so much as the mulberry-trees (for then they made a great deal of raw silk here); and in this condition it continued till about eighteen years ago."—Extracted from Harris's complete collection of *Voyages in Chinese Repository*, vol. ix. p. 133.

Chusan, as well as most of the smaller islands, presented on our first approach in July 1840, a striking and novel appear-

ance; a crowded population manifested itself in the cultivation of every spot which by art of man could be forced to administer to the first necessities of life. To meet the demand of an over-population, every inch of ground is laid under contribution for the greatest possible amount of produce; in fact, industry has increased the original arable land in the rich alluvial valleys by transforming the naked sides of the hills, covered in many places by a barely one-foot-deep crust of disintegrated rock, into cultivated terraces. The highest hill at Chusan is not above 1800 feet above the level of the sea; the rest are of a much less elevation, and admit in most places of terrace-cultivation to their summit.

Position and climate warrant us, as before observed, to draw the inference, that Chusan in its fauna and flora cannot originally have differed materially from the opposite main-land, though the absence of rivers, lakes, and lastly forests, cannot but greatly influence either; in other words, the same animal and vegetable productions may be presumed to exist in the neighbouring regions of the continent, but with greater variety in forms and in numbers, inasmuch as both are affected by the presence or absence of rivers, lakes, and forests. To which should be added another consideration, the changes which the original physical aspect of a country must undergo by cultivation. Thus it may be assumed, that Chusan may afford a criterion of the fauna and flora of the neighbouring regions of China, but only to a limited extent.

In the cultivation at Chusan rice holds the first rank, and of that there seem to be two varieties; one cultivated in the valleys by the aid of irrigation, another on the heights, where the protracted periodical falls of rain afford a substitute for the art displayed by the Chinese agriculturist. During our first occupation of Chusan the rice-harvest commenced in the end of August, but soon after a new crop was observed to spring up between the drills or ridges of the old, which, irrigated partly by the celebrated water-wheels, and partly by the subsequent heavy showers of rain, seemed to promise another harvest before the setting-in of the winter season. The amount of the produce is such as to enable the inhabitants to dispose of a vast surplus, and this is the chief staple commodity, which is exported either as paddy or converted into "sám-shoo," a spirituous liquor distilled from rice. To judge by the number of distilleries and the quantity of samshoo in store at Ting-haé, it would seem that the city exports the greater quantity of rice converted into that commodity. All other kinds of grain occupy a secondary rank, such as *Holcus Sorghum* (Barbadoes



millet), *Polygonum*, of which several species are cultivated, one of them for the sake of the blue dye it yields, Job's-tears (*Coix Lachryma*), and maize. Of vegetables, *Convolvulus Batatas* (sweet potatoe) seems to be the greatest favourite with the Chinese; also *Solanum Melongena* (brinjal), *Chenopodium* (spinach), *Nelumbium*, *Cucurbita maxima* (pumpkin), water-melons, ginger, and turnips. Of fruit-trees, apples, pears, quinces, peaches, walnuts, grapes and citrons. Although both fruit and vegetables thrive remarkably well, they are of a very inferior description; rice, the staff of life, has engrossed all the care of the Chinese agriculturist, who looks upon all other objects of cultivation as secondary. There seems however to be every reason to believe that most European sorts of grain, vegetables and fruit would succeed at Chusan.

To the former vegetable productions are to be added, *Thea sinensis*, *Stillingia sebifera*, *Elæococcus Vernicia*, and *Nicotiana*. Tea is grown exclusively for the consumption of the inhabitants, and most of the houses and farms have either small plots allotted to the shrub, or it is planted in hedges or on the fine stone walls with which the houses are commonly surrounded. The shrub was in flower in July, had ripe fruit at the end of September, and flowered again at the commencement of November. The tea at Chusan when seen in leaves was even by judges considered to be of the black kind, but when made into infusion its colour and flavour were those of the green kind. On my inquiries from the farmers whether they made black and green tea indiscriminately from the same shrub, I was invariably told they gathered the leaves and prepared them, such as they were, without paying any further attention. The fact is, they are evidently not initiated in the secrets of the manufacturing districts, and their tea is of such inferior quality that it cannot form an article of commerce. A gentleman of one of the commercial firms in Macao, who visited Chusan during our first occupation, informed me that with great trouble he had contrived to collect some ninety pounds of tea on the island, for which he paid a price far beyond its value, solely with a view to encourage the inhabitants to establish commercial intercourse.

The fresh leaf is coarse and nearly  $2\frac{1}{2}$  inches in length. The capsules either contain a single seed, and their outline is then circular; or two seeds, which make the outline resemble the Arabic character of number 8; or seldom three, in which case the outline acquires a blunt triangular shape.

*Stillingia sebifera* is cultivated to a considerable extent for the sake of the tallow-like matter which covers the ripe fruit.

It flowers in the month of July and August, and the fruit arrives at maturity in November, when the capsule containing three seeds bursts open. The process by which the vegetable tallow is secured is very simple. The seeds, after having been taken out of the capsules, are thrown into large vessels of boiling water, which, after being allowed to cool, leaves the pure white hardened substance, insoluble in alcohol, on the surface. The latter is again melted and formed into candles over wicks of thin bamboo or straw, which have been lengthways surrounded by a closely fitting spiral of thinner straw. These candles, which are said to form a no small article of exportation, are originally of a beautiful white colour, but sometimes dyed red; they burn remarkably well, without any unpleasant smell, and notwithstanding the rudely made wick, give a very good light. I have kept several of these candles exposed to the influence of the hot season in Calcutta, notwithstanding which they did not lose their original hardness. *Stillingia sebifera* has many years ago been introduced in Bengal, where it seems to thrive remarkably well; but Dr. Roxburgh observes, that the temperature of the winter season is not sufficiently low to allow the substance to congeal. This seems also to be the case in Canton province, where the substance is mixed with animal tallow, and thus fabricated. I have been informed that the tree is found in our northern territories, where there would seem to be no obstacle to prevent the substance from being applied to æconomical purposes and as a useful vehicle for ointments, but I am not aware of such experiments having been tried.

The cotton plant (with white flowers) succeeds very well, and is grown in many places, but to a very limited extent, and solely for the use of the cultivators; and such is also the case with tobacco. Small plantations of *Elaeococcus Vernicia*, Juss., are seen here and there. The varnish it yields, although of inferior quality, is in great demand for furniture, and indeed for all the frame-work of the houses.

On the sides of the hills, where the scantiness of soil or the steepness is such as not to admit the plough, oaks and pines are raised for fuel: either attain to but a small size. The oak, I am informed by Mr. Griffith, is very like one which he discovered in the Khasyah Hills. The leaves resemble those of *Quercus infectoria*, while the sessile flowers approximate it to *Q. sessiflora*. A few very fine large junipers are seen in gardens. Firewood, vegetable and mineral coals, as well as timber, form articles of importation.

The agricultural implements at Chusan are of a description

superior to those used in the southern provinces, particularly the plough, the winnow, and the chain-pumps. Although the Chinese may be said to be pre-eminently an agricultural nation, and it has been the policy of their government to encourage and acknowledge agriculture as one of the most honourable pursuits, the eminence it has attained has been somewhat overrated. In the mere mechanical parts, such as the distribution of human labour in the cultivation of rice, and in a few instances of adopting the simplest means, the Chinese may be said to have arrived at perfection; but in the higher branches the Chinese are far behind the best European rural æconomists. It has been observed, that the small allotments of land in China must necessarily preclude any attempt at extensive operations, and while the individual is confined to raise a crop barely sufficient to maintain his own family, accommodation of the crop to the soil is almost entirely out of the question. As for the rest, nothing can be said of the agriculture at Chusan that has not already been noticed elsewhere, with one exception, and that is the unheard of and equally repulsive means to which the inhabitants resort to obtain manure for the fields. Suffice it to say, that in Ting-haé the inhabitants make a point of collecting the offal, which in a city it is the first duty to the health of the public to carry away, as it is to decency to hide. Here every house-owner not only makes this a source of traffic, for it is sold to the tillers of the soil, but the consequence of this custom has manifested itself in the social state of the people and obliterated all feeling of decorum\*.

The period of our first occupation of Chusan, from the commencement of July 1840 till March 1841, was too short to afford data sufficient to obtain the annual mean tempera-

\* In a short and interesting topographical account of Chusan, published in the 'Chinese Repository,' vol. x. p. 328, the following description of Ting-haé is given:—"The city possesses no large gardens or squares, but a considerable extent of open ground on the eastern side is devoted to the cultivation of rice. The canal, which nearly surrounds the city, sends a large branch through a water-gate near the southern gate, which, dividing into many branches, traverses the greater part in all directions. These branches form several large pools of foul stagnant water, into which every description of filth was thrown, and the street-sewers also opening into the canals rendered the latter extremely offensive, and during the warm weather caused a most unpleasant smell throughout the city. Added to this source of malaria, great numbers of large jars were placed at the corners of most of the streets and in all vacant places, which were filled with a fermenting mass of animal and vegetable offal, gathered from the houses and preserved for manuring the fields in the neighbourhood; as may be supposed, in some of those places the stench was dreadful."



ture and that of the four seasons. As the day however is not far distant when China will be no longer a field of speculation but one of research, it is preferable to await the sure results of continued meteorological observations, although the following few extremes may suffice to show the range of the thermometer. The observations were made in the open air in the shade.

	Highest.	Lowest.
July . . . . .	86°	79°
August . . . . .	93	76
September . . . . .	100	71
October . . . . .	84	58

On our first arrival in July the weather was very pleasant; the heat became oppressive towards the end of August, particularly at night, and remained so till the end of September, when heavy and protracted showers of rain made their appearance and did not cease till the end of November. The winter season commences in November, and I am informed that snow fell in the end of December, and that the thermometer sunk in January to 22°.

These great vicissitudes in climate manifest themselves in the absence of the brilliancy of the Indian flora and the frequent occurrence of true European forms. The Indian forms are of stunted growth, and many of them, such as the palms and the plantain, which are cultivated, do not arrive at maturity. Among the beauties of the wild flowers are a cærulean *Commelina* and *Plumbago*, *Ipomœa cærulea*, a delicate lilac *Aster*, *Nelumbium*, *Oxalis stricta*, a white *Clerodendron* and a lilac *Lycium*. In August ripe brambles and raspberries were found on the sides of the hills. The strawberry, which is very plentiful, was ripe in the commencement of August; the fruit is insipid, and by the Chinese fancied to be poisonous\*. The plant was again in flower (of a rich gamboge colour) in the middle of September.

The hop plant, which may almost be said to cover Chusan and such of the surrounding islands as I had an opportunity to visit, flowered in August, and was in fruit in September and the commencement of October. When first I observed the *Humulus*, I became anxious to ascertain if it might not originally have been introduced by the English during the time of the Factory; but the inquiries which Mr. Gutzlaff was kind enough to make among the inhabitants, who, although it is

\* A *Fragaria*, probably the same, has been observed at Nagree, in Sik-kim, by J. W. Grant, Esq.

not used, have several names for the plant, have established it beyond doubt to be indigenous. A group highly characteristic of the flora of Chusan attracted my attention in a tea-plantation; it consisted of a tea-shrub entwined by a hop-plant and surrounded by a strawberry, a bramble, *Artemisia vulgaris*, *Hypericum perforatum*, *Viola canina*, a pine, an oak, a plantain, and a fan-palm.

The following list of plants, collected at random, some of which I identified, with their genera, on the spot, while for the rest I am indebted to the kindness of Mr. Griffith, will serve to give some features of the flora.

*Plants flowering at Chusan in July, August and September.*

A. EXOGENÆ.

<i>Ranunculaceæ.</i>	<i>Xanthoxylaceæ.</i>
Ranunculus sceleratus.	Xanthoxylum.
<i>Nelumbiaceæ.</i>	<i>Oxalidaceæ.</i>
Nelumbium.	Oxalis stricta.
<i>Cruciferaæ.</i>	<i>Celastraceæ.</i>
Thlaspi.	Ilex.
Brassica.	Euonymus.
Sinapis.	<i>Rhamnaceæ.</i>
<i>Resedaceæ.</i>	Zizyphus.
Reseda luteola?	<i>Anacardiaceæ.</i>
<i>Tamaricaceæ.</i>	Rhus.
Tamarix.	<i>Fabaceæ.</i>
<i>Violaceæ.</i>	Phaseolus.
Viola canina?	Melilotus.
<i>Sterculiaceæ.</i>	<i>Rosaceæ.</i>
Sterculia.	Rosa sinica.
<i>Malvaceæ.</i>	<i>Potentilleæ.</i>
Gossypium.	Potentilla.
Hibiscus.	Rubus idæus.
<i>Aurantiaceæ.</i>	— Chamæmorus.
Citrus.	Fragaria.
<i>Ternstræmiaceæ.</i>	Geum rivale?
Thea chinensis.	<i>Amygdaleæ.</i>
Camellia.	Amygdala persica.
<i>Hypericaceæ.</i>	Prunus.
Hypericum perforatum.	<i>Pomeæ.</i>
— montanum?	Malus.
<i>Aceraceæ.</i>	Pyrus.
Acer.	Cydonia.
<i>Vitaceæ.</i>	Eriobotrys japonica.
Vitis vinifera.	<i>Lythraceæ.</i>
<i>Balsaminaceæ.</i>	Lagerstrœmia indica.
Balsamina.	



*Myrtaceæ.*

Myrtus.

Punica Granatum.

*Cucurbitaceæ.*

Cucumis Melo.

(Red and white water melons.)

Cucurbita maxima.

——— lagenaria.

Actinostemma (nov. gen.),

Griffith.

*Portulacaceæ.*

Portulaca.

*Illecebraceæ.*

Herniaria (prope glabram).

*Crassulaceæ.*

Sedum.

Sempervivum.

*Hamamelaceæ.*

Hamamelis.

*Araliaceæ.*

Hedera Helix.

Panax aculeatus.

*Apiaceæ.*

Daucus Carota.

Carum.

*Caprifoliaceæ.*

Sambucus japonica.

*Cinchonaceæ.*

Pæderia foetida.

Gardenia.

*Compositæ.*

Aster.

Bidens.

Lactuca.

Gnaphalium.

Inula.

Senecio?

Chrysanthemum.

Artemisia sinensis.

*Oleaceæ.*

Olea fragrans.

*Jasminaceæ.*

Jasminum.

*Convolvulaceæ.*

Convolvulus Batatas.

Ipomæa cærulea.

*Solanaceæ.*

Solanum nigrum.

——— Dulcamara.

Solanum Melongena.

——— Lycopersicum.

Datura fastuosa.

Nicotiana.

Capsicum.

Lycium.

*Primulaceæ.*

Anagallis.

*Lamiaceæ.*

Rosmarinus officinalis.

Mentha.

Origanum.

Marrubium.

*Verbenaceæ.*

Verbena.

Clerodendron.

*Sesameæ.*

Sesamum.

*Plumbagineæ.*

Plumbago.

*Plantagineæ.*

Plantago.

*Chenopodiaceæ.*

Chenopodium Bonus Henri-

cus.

Celosia cristata.

*Begoniaceæ.*

Begonia.

*Polygonaceæ.*

Polygonum Fagopyrum.

Rumex Acetosa.

Rheum.

*Eleagneaceæ.*

Eleagnus.

*Euphorbiaceæ.*

Stillingia sebifera.

Elæococcus Vernicia.

Phyllanthus.

*Chloranthaceæ.*

Chloranthus inconspicuus.

*Salicaceæ.*

Salix babylonica.

——— ?

*Urticaceæ.*

Urtica.

Cannabis sativa.

Morus.

Ficus.

Humulus Lupulus.

*Cupuliferae.*

Quercus.

*Juglandaceae.*

Juglans regia.

*Taxaceae.*

Salisburia adiantifolia.

*Coniferae.*

Pinus.

Juniperus.

Cupressus.

## B. ENDOGENÆ.

*Hydrocharaceae.*

Hydrocharis Morsus ranæ.

*Scitamineæ.*

Zingiber officinale.

*Orchidaceæ.*

Herminium?

*Musaceæ.*

Musa.

*Iridaceæ.*

Iris.

Pardanthus.

*Liliaceæ.*

Lilium.

Allium.

*Commelinaceæ.*

Commelina.

*Palmaceæ.*

Raphis flabelliformis.

Areca Catechu.

*Alismaceæ.*

Alisma Plantago.

Sagittaria.

*Pistiaceæ.*

Lemna.

*Graminaceæ.*

Triticum.

Zea Mays.

Saccharum officinarum.

## Bambusa.

Oryza.

Poa.

Coix Lachryma.

Holcus Sorghum.

Setaria.

Panicum.

Andropogon.

*Lycopodiaceæ.*

Lycopodium.

*Filices.*

Filix.

Pteris.

Aspidium.

Lygodium.

Nephrodium.

Asplenium.

Pleopeltis.

*Musci.*

Muscus hypnoides.

*Lichenes.*

Bæomyces?

*Algæ.*

Conferva.

Sargassum.

*Fungi.*

Agaricus.

The causes which affect the fauna of Chusan have been noticed in the preceding pages, and we may, from these, infer its poverty in variety of forms. It has been asserted that scarcely any large wild beasts are found in the Chinese empire; a dense population, which may be said to be *par excellence* agricultural, would *à priori* corroborate this opinion. At Chusan, which is comparatively a young colony, deer\*, which

\* It may as well be mentioned that two fine deer, *Cervus Axis*, of which the Chinese are very fond, were brought in 1840 in a junk from Formosa to Chusan. One of them, which I kept, died in the commencement of November, apparently from the vicissitudes of the weather.

were plentiful in Mr. Cunningham's time, are at present entirely unknown. Over-population cannot admit of the co-existence of the larger domesticated animals: thus, the few bullocks which were found on our first occupation were solely used for agricultural purposes; but there were neither buffaloes nor sheep, which latter (a broad-tailed kind) are said to be plentiful all over China. The food of the people is chiefly vegetable, and fish may be said to form the principal animal food. Among the Mammalia there is at least one Indian species, for several skins of the scaly ant-eater which I examined at Chusan, and were said to have been procured on the island, belonged to *Manis pentadactyla*, Linn. "This," Mr. Ogilby observes in his interesting memoir on the Mammalogy of the Himalayas, "the only species of the family known to inhabit the continent of Asia, is found in the lower and less elevated parts of the central regions; but all the *Edentata* are essentially inhabitants of the warmer parts of the earth, more especially of tropical America, and we cannot therefore expect to find their forms reproduced in the Himalayas."

Scantity of forms is a striking feature in the ornithology of Chusan, and it can scarcely be doubted that the absence of forests is one of the principal causes. During my stay on the island, I never saw nor heard of others having observed a bird of prey. As before mentioned, the Chinese exist upon vegetable food; and when, which is very seldom the case, carrion is exposed, it is soon discovered by the numerous half-reclaimed dogs. The great care which the Chinese bestow upon the burial of the remains of their dead may also be here noticed. Nearly all of the birds which will be enumerated below are very numerous, and among them there are some common European forms, such as the magpie, tree-sparrow (both also occur in Japan), blackbird, and some which are equally common in Bengal, such as the little kingfisher, the drongo or king crow, both of which were observed by Col. Sykes in the Dukhun; where also the common swallow of Chusan, which leaves in August, *Hirundo erythropygia*, Sykes, "appeared in millions in two successive years in the month of March in the parade ground at Poona; they rested a day or two only, and were never seen in the same numbers."—Catalogue of Birds in the Dukhun, Proceed. Zool. Soc. 1832, Pt. II. p. 83.

Of Chelonian Reptiles but two forms were found, one of which, *Trionyx tuberculatus*, approaches closely to *T. javanicus*. None of the large Saurians occur, nor Monitors; but both the little *Hemidactylus*, which is very numerous, and the *Tiliqua* are nearly allied to species inhabiting Bengal and other parts of India. It has generally been believed, that



China is infested with very few serpents. At Chusan, although few in species, they are remarkably numerous. *Naja*, which appears to be the only terrestrial venomous serpent, as well as the species of *Lycodon*, *Coluber* and *Tropidonotus*, are, as pointed out in the descriptions, closely allied to Indian species. *Python Schneideri* has hitherto been found only in Java, Banca, Amboyna, and once at Malacca. All these, however, are forms which characterize tropical Asia. I am told that several species of Pelagic serpents occur in the Chusan Archipelago. Although none have come under my observation, there seems to be no doubt about their existence in the latter locality, as they have been found at Japan; and it may be observed, that certain species of fish which form their favourite prey are as plentiful as in the Bay of Bengal. The serpents of Chusan are different from those of Japan, where their specific strength is in the same proportion to their numerical as in the former island. M. Schlegel observes, that the terrestrial serpents of Japan seem chiefly to represent European forms, while a species of the genus *Trigonocephalus* is the only form establishing analogy between the fauna (?) of Japan and that of India or the tropical regions in general. (Fauna Japonica, Ophidii, p. 82.) This is partly correct in as far as the genus is concerned. But M. Schlegel has described another Japanese serpent, *Tropidonotus Vibakari*, which, to judge from the description and figure, is very closely allied to *T. surgens* and to *T. maestus*, both found in Bengal (Proceed. Zool. Soc. 1839), and perhaps, by the peculiarity of its integuments, also to *T. rufodorsatus* of Chusan. In the Batrachian Reptiles there exists a striking resemblance between the fauna of Chusan and Japan: in both the frogs are European forms, the toads not; *Bufo gargarizans* approaches to the Indian toad, figured as *B. dubia* in General Hardwicke's 'Illustrations.'

With the Pelagic fishes but little opportunity was afforded to become acquainted, as unfortunately the fishermen had followed the example of most of the other inhabitants, who had fled on our first occupation of Chusan in 1840. No other nation derives so much nourishment from the sea and the rivers as the Chinese. On the passage in June 1840 through the Formosa Channel, along the provinces of Fokeen and Chekeang, we daily fell in with hundreds of boats, a certain number of which accompanied each fishing-junk of 200 to 300 tons burden. These craft anchor and send out their small but fine-sailing little boats, each manned with four to six men, who act in concert so as to form one long line of nets, distinguished at intervals by little flags attached to floating pieces of bamboo. The time which must elapse before the nets can

become filled with fish is employed in angling with hook and line. A few hauls were sufficient to fill the boats, which then repair to their junk, the common receiver of their harvest. To judge by the list of fishes of Macao given in Mr. Bridgman's 'Chrestomathy,' the Chinese sea must be rich in forms. The following few came under my observation at Chusan :—

Labrax japonicus, Cuv.	Clupea affinis, Gray Illust. Ind.
Nebris.	Zool.
Umbrina.	Engraulis Hamiltonii, Gray Illust. Ind. Zool.
Hæmulon.	Solea Zebra ?
Stromateus albus, "Pomfret."	Carcharias.
———— niger, "Pomfret."	Trygon.
———— securifer, Cuv.	
Trichiuris savala, Cuv.	

To this may be added another small collection from the entrance of the river Peiho, for which I am indebted to Dr. George Playfair :—

Labrax japonicus.	Calliomorus Chaca, Ham.
Mugil parsia, Ham.	Engraulis Hamiltonii.
Gobioides rubicunda, Ham.	Tetrodon.

Nearly all these forms inhabit also the Bay of Bengal and other parts of the Indian Ocean.

Among the fishes inhabiting fresh water and estuaries, the greater number are Indian forms : two species inhabit Bengal, viz. *Anabas scandens*, Cuv., and *Cyprinus daniconius*, Ham.; one is Javanese and three are Europæan ; among the latter is an eel, which seems to be identical with *Anguilla latirostris*, Yarrell.

The terrestrial and fluviatile Mollusks are remarkably rich in forms, not only in point of variety but also in interest, which will be seen by the excellent descriptions from the pen of W. H. Benson, Esq. A few approach to Europæan forms ; three are identical with Indian, viz. *Helix*\* *tapeina*, Benson, *Planorbis compressus*, Hutton, and *Helix naninoides*, which last is also found at Singapore.

Among the Annelides occurs a remarkable form, with the anterior part drawn out to the sides like the head of *Zygæna* or *Cerambyx Fichtelii*; another, but of a different species, was first discovered by Mr. Griffith in 1836, found under stones in the Naga Hills; a third species has been observed in Bengal.

Of the Crustacea, one approaches to an Europæan form, the rest are tropical.

\* *Helix cestus*, Benson, which inhabits the N.E. frontier of Bengal, is very common about Macao and the islands in Canton river.

The Arachnida are remarkable for their numerical strength, their habits, and the size to which some of them attain. *Epeira fasciata*, Walckenaer, appears to be the only Europæan species inhabiting Chusan.

With regard to the Entomology of Chusan (a collection of insects having been despatched to the Museum of the Hon. the Court of Directors, and a duplicate series by order of Government to the Entomological Society of London), it must suffice to state, that Indian forms prevail and Europæan forms are not numerous. Many identical species occurred in the extensive collections formed in the Khasyah Hills and Assam\* in 1835–36, by Messrs. McClelland and Griffith. Among the forms characteristic of Chusan were a species of *Tingis*, a *Centrotus*, and a brilliant golden green *Agrion* with black wings.

[To be continued.]

### XXXII.—Notice of the Genus Murchisonia.

By M. D'ARCHIAC†.

ON taking a survey of the numerous genera of the Gastropodous Mollusca, we find in many cases, especially in the fossil genera, shells possessing the peculiar character of a more or less deep sinus or notch on the right lip. Thus, amongst the *Naticæ* we find *Natica cineta* (Phill. Geol. of Yorksh., pt. 1. pl. 4. fig. 9), and perhaps *Buccinum vittatum* (Phill. Geol. of Yorksh., pt. 2. pl. 16. fig. 14), as well as several other shells of pl. 15 of the latter work. Between *Solarium* and *Euomphalus* we find the genus *Schizostoma* of Bronn, and certain shells not yet classed from the lower oolite of Calvados and the carboniferous limestone of Belgium. The latter certainly do not present a proper notch on the last whorl, but a certain number of holes, which close as the shell advances in age, nearly in the same manner as in *Haliotis*. Between *Trochus* and *Turbo* we find *Pleurotomaria* and *Seissurella*; between *Cerithium* and *Fusus* the great genus *Pleurotoma*. Lastly, *Nerineæ*, the situation of which does not

\* The richness and interest of the fauna and flora of the province of Assam, which from its position is of our Indian dominions the one most calculated to throw light upon the south-western part of China Proper (Yunnan), may be inferred from the reports and collections of the two above-named naturalists: Mr. Griffith has added further to our knowledge by the botanical and zoological collections which he has continued forming by native collectors, trained and privately maintained by himself, in the Khasyah Hills.

† From the Bulletin of the French Geological Society, vol. xii. 1841.—We are indebted for the translation to Thomas Johnson, Esq., of Hexham.